What is the relationship between screen time and body weight in adults?

Conclusion

Strong and consistent evidence in both children and adults shows that screen time is directly associated with increased overweight and obesity. The strongest association is with television screen time.

Grade: Strong

Overall strength of the available supporting evidence: Strong; Moderate; Limited; Expert Opinion Only; Grade not assignable For additional information regarding how to interpret grades,click here.

Evidence Summary Overview

The literature review identified eight prospective cohort studies (Erik Landhuis, 2008; Hancox, 2004; Hu, 2003; Koh-Banerjee, 2003; Oken, 2007; Parsons, 2008; Raynor, 2006; Viner, 2005). All eight studies examined television viewing only and did not examine other types of screen time. The studies were conducted in the US, New Zealand and the United Kingdom. Studies ranged in sample size from 902 (Oken, 2007) to 50,277 (Hu, 2003) and one study included only men (Koh-Banerjee, 2003), two studies included only women (Hu, 2003; Oken, 2007). All eight included studies found a positive relationship between television viewing and body weight inadults.

Evidence Summary Paragraphs

Cohort Studies (8)

Erik Landhuis C et al, 2008 (positive quality) analyzed prospective cohort data from New Zealand to assess whether the long-term effects of childhood television viewing on BMI is mediated by adult TV-viewing. Subjects were enrolled at age three years and followed through age 32 years. At ages five to 11, parents reported how much time children spent watching TV on weekdays and at ages 13, 15 and 32, subjects reported how much time they spent watching TV on weekdays and weekends. At age 32, height and weight were measured to calculate BMI. The final sample included 927 subjects. Childhood and adult TV-viewing each predicted higher BMI at age 32 years (childhood=0.48,95% CI 0.09, 0.88, P=0.017; adult=0.28, 95% CI 0.05, 0.51; P=0.019, respectively). Regression analyses showed that childhood TV-viewing predicted adult obesity (OR=1.30, 95% CI for each hour of viewing 1.07-1.58), a relationship that remained significant even after controlling for adult TV-viewing. The authors concluded that increased television viewing during childhood and adulthood is significantly associated with increased risk of obesity among adults.

Hancox R et al, 2004 (positive quality) analyzed prospective cohort data from New Zealand to assess whether the long-term effects of childhood television viewing on BMI is mediated by adult TV-viewing. Subjects were enrolled at age three years and followed through age 26 years. At ages five to 11, parents reported how much time children spent watching TV on weekdays, and at ages 13, 15 and 21 subjects reported how much time they spent watching TV on weekdays and weekends. For this study, the TV viewing variable used was the mean viewing hours per weekday

between ages five to 15 years. At age 26, height and weight were measured to calculate BMI. The final sample included 980 subjects. Average weeknight TV viewing between ages five to 15 years was associated with higher BMI (P=0.0013) at age 26 years. Approximately 17% (95% CI 7 to 25) of overweight in 26-year olds could be attributed to watching TV for more than two hours per day. The authors concluded that increased television viewing during childhood and adulthood is significantly associated with increased risk of obesity among adults.

Hu F et al, 2003 (positive quality) used prospective cohort data from the United States to examine the relationship between TV-viewing and risk of obesity in women. Subjects were from the Nurses' Health Study, and data were collected from 1992 to 1998. In 1992, subjects reported the average time spent watching TV or VCR, with response items of zero to one, two to five, six to 20, 21-40 and >40 hours per week. Body weight and height was self-reported biennially and BMI was calculated. The final sample includes 50,277 women. Time spent watching TV was positively associated with risk of obesity; each two hours per day increment in TV watching was associated with a 23% (95% CI 17-30%) increase in obesity. The authors concluded that TV-watching was associated with a significantly elevated risk of obesity over time among middle-aged women.

Koh-Banerjee P et al, 2003 (positive quality) analyzed prospective cohort data from the United States to determine the association between TV watching and weight gain in men. Subjects were from the Health Professionals Follow-up Study and data was collected over the nine-year period from 1987 to 1996. Subjects reported the average time spent per week watching TV, and self-reported height, weight and waist circumference biennially. The final sample included 16,587 men. An increase in TV-watching was significantly related to a 0.30 cm increase in waist circumference (P=0.02). The authors concluded that increased TV-viewing was significantly associated with increased abdominal adiposity in middle-aged men.

Oken E et al, 2007 (positive quality) used prospective cohort data from the United States to examine associations between postpartum TV-viewing and weight retention at least 5kg at 12 months postpartum. Subjects were enrolled in Project Viva and were followed for one year after giving birth. At six-months postpartum subjects reported the average weekly hours they spent watching TV or videos, and postpartum weight retention was determined as the difference between self-reported 12-month-postpartum and pre-pregnancy weight. The final sample included 902 women. Women reported a mean of 1.7 hours per day of TV-watching. The odds ratio of retaining at least 5kg weight postpartum was 1.24 (95% CI 1.06-1.46) per daily hour of TV-viewing. Women who watched less than two hours per day of TV had an odds ratio of 0.23 (85% CI 0.08-0.66) of retaining at least 5kg postpartum. The authors concluded that postpartum TV viewing was associated with weight retention.

Parsons T et al, 2008 (positive quality) analyzed longitudinal data from the United Kingdom to assess whether frequency of TV-viewing in adolescence (16 years) or adulthood (23 years) affect subsequent changes in BMI through mid-adulthood (45 years). Baseline data were collected at birth in March 1958, with subsequent data collection time points at ages seven, 11, 16, 23, 33, 42 and 45 years. Participants reported TV-viewing frequency at 11, 16, (often, sometimes, never or hardly) and 23 years (at least five, three to four, one to two times per week, two to three times per month, one time per month or not at all) and daily duration at 45 years. Height and weight were measured at 11, 16, 33 and 45 years, and self-reported at 23 years. The final sample included 11,971 subjects. Watching TV "often" at 16 years (but not 11 years) was associated with a faster gain in BMI between 16 and 45 years in males (0.011 kg/m^2 per year, 95% CI 0.0003-0.019) and females (0.013kg/m^2 per year, 95% CI 0.003-0.023). More frequent TV viewing at 11, 16 and 23 years was associated with faster gain in BMI between 23 and 45 years in females, but not in males. The authors concluded that more frequent TV-viewing in adolescence and early adulthood is associated

with greater BMI gains through to mid-adulthood.

Raynor D et al, 2006 (positive quality) analyzed prospective cohort data from the United States to examine the role of TV-viewing in long-term maintenance of weight loss. Subjects were from the National Weight Control Registry. Participants self-reported the average number of hours of weekly TV-viewing, height and weight at entry into the study and at one-year follow-up. The final sample included 1,422 subjects. Both baseline TV-viewing ($P<0.02$) and increases in TV-viewing ($P<0.001$) over the follow-up were significant predictors of one-year weight regain. The authors concluded that individuals who watch less TV are more successful at maintaining weight loss over time.

Viner R and Cole T, 2005 (positive quality) examined prospective cohort data from the United Kingdom to examine the effects of duration, timing and type of TV-viewing at age five years on BMI in adult life. Subjects were from the 1970 British Birth Cohort, who were followed up at five, 10 and 30 years. The amount of weekday and weekend TV-viewing at five years was reported by parents. Height and weight were obtained by self-report at 30 years and BMI z-score was calculated. The final sample included 8,158 subjects. Mean daily hours of TV viewed on weekends predicted higher BMI z-score at 30 years (coefficient=0.30, 95% CI 0.01, 0.05, P=0.01). Each additional hour of TV watched on weekends at five years increased risk of adult obesity by 7% (OR=1.07, 95% CI 1.01, 1.13, P=0.02). The authors concluded that increased weekend TV-viewing during early childhood is associated with greater risk of obesity in adulthood.

View table in new window

Author, Year, Study Design, Class, Rating	Participants/Location	Methods: Diet Assessment, Adiposity Measurement	Outcomes
Erik Landhuis et al 2008 Study Design: prospective cohort study Class: B Rating:	N= 927 subjects. Location: New Zealand.	Subjects were enrolled at age three years and followed through age 32 years. At ages five to 11, parents reported how much time children spent watching TV on weekdays, and at ages 13, 15 and 32, subjects reported how much time they spent watching TV on weekdays and weekends. At age 32, height and weight were measured to calculate BMI.	Childhood and adult TV-viewing each predicted higher BMI at age 32 years (childhood=0.48, 95% CI 0.09, 0.88, P=0.017; adult=0.28, 95% CI 0.05, 0.51; P=0.019, respectively). Regression analyses showed that childhood TV viewing predicted adult obesity (OR=1.30, 95% CI for each hour of viewing 1.07-1.58), a relationship that remained significant even after controlling for adult TV viewing.

Hancox, Milne and Poulton 2004 Study Design: Longitudinal Cohort Study Class: B Rating:	N=980 subjects. Location: New Zealand.	Subjects were enrolled at age three years and followed through age 26 years. At ages five to 11, parents reported how much time children spent watching TV on weekdays, and at ages 13, 15 and 21 subjects reported how much time they spent watching TV on weekdays and weekends. For this study, the TV-viewing variable used was the mean viewing hours per weekday between ages five to 15 years. At age 26, height and weight were measured to calculate BMI.	Average weeknight TV-viewing between ages five to 15 years was associated with higher BMI (P=0.0013) at age 26 years. Approximately 17% (95% CI seven to 25) of overweight in 26-year olds could be attributed to watching TV for more than two hours per day.
Hu et al 2003 Study Design: Prospective cohort study design Class: B Rating:	N=50,277 women. Location: United States.	Subjects were from the Nurses' Health Study, and data were collected from 1992 to 1998. In 1992, subjects reported the average time spent watching TV or VCR, with response items of zero to one, two to five, six to 20, 21-40, and >40 hours per week. Body weight and height was self-reported biennially and BMI was calculated.	Time spent watching TV was positively associated with risk of obesity; each two hours per day increment in TV watching was associated with a 23% (95% CI 17-30%) ↑ in obesity.
Koh-Banerjee P, Chu NF et al, 2003 Study Design: Prospective Cohort Study	N=16,587 men. Location: United States.	Subjects were from the Health Professionals Follow-up Study and data was collected over the nine-year period from 1987 to 1996. Subjects reported the	An increase in TV-watching was significantly related to a 0.30cm ↑ in waist circumference (P=0.02).

Class: B Rating:		average time spent per week watching TV, and self-reported height, weight and waist circumference biennially.	
Oken et al 2007 Study Design: Prospective cohort study Class: B Rating:	N=902 postpartum women. Location: United States.	Subjects were enrolled in Project Viva and were followed for one year after giving birth. At six-months postpartum subjects reported the average weekly hours they spent watching TV or videos and postpartum weight retention was determined as the difference between self-reported 12-month postpartum and pre-pregnancy weight.	Women reported a mean of 1.7 hours per day of TV-watching. The OR of retaining at least 5kg weight postpartum was 1.24 (95% CI 1.06-1.46) per daily hour of TV-viewing. Women who watched less than two hours per day of TV had an OR of 0.23 (85% CI 0.08-0.66) of retaining at least 5kg postpartum.
Parsons TJ et al. 2008 Study Design: Longitudinal prospective study Class: B Rating:	N=11,971 subjects. Location: United Kingdom.	Baseline data were collected at birth in March 1958, with subsequent data collection time points at ages seven, 11, 16, 23, 33, 42 and 45 years. Participants reported TV viewing frequency at 11, 16, (often, sometimes, never or hardly) and 23 years (at lest five, three to four, one to two times per week, two to three times per month, one time per month or not at all) and daily duration at 45 years. Height and weight were measured at 11, 16, 33 and 45 years, and self-reported at 23 years.	Watching TV “often” at 16 years (but not 11 years) was associated with a faster gain in BMI between 16 and 45 years in males (0.011kg/m^2 per year, 95% CI 0.0003-0.019) and females (0.013kg/m^2 per year, 95% CI 0.003-0.023). More frequent TV viewing at 11, 16 and 23 years was associated with faster gain in BMI between 23 and 45 years in females, but not in males.

Raynor et al 2006 Study Design: Prospective Cohort Study Class: B Rating:	N=1,422 subjects. Location: United States.	Subjects were from the National Weight Control Registry. Participants self-reported the average number of hours of weekly TV viewing, height and weight at entry into the study and at one-year follow-up.	Both baseline TV viewing (<0.02) and ↑ in TV viewing (P<0.001) over the follow-up were significant predictors of one-year weight re-gain.
Viner and Cole 2005 Study Design: Prospective Cohort Class: B Rating:	N=8,158 subjects. Location: United Kingdom.	Subjects were from the 1970 British Birth Cohort, who were followed up at five, 10 and 30 years. The amount of weekday and weekend TV-viewing at five years was reported by parents. Height and weight were obtained by self-report at 30 years and BMI z-score was calculated.	Mean daily hours of TV viewed on weekends predicted higher BMI z-score at 30 years (coefficient=0.30, 95% CI 0.01, 0.05, P=0.01). Each additional hour of TV watched on weekends at five years ↑ risk of adult obesity by 7% (OR=1.07, 95% CI 1.01, 1.13, P=0.02).

Research Design and Implementation Rating Summary
For a summary of the Research Design and Implementation Rating results, click here.

Worksheets

Erik Landhuis C, Poulton R, Welch D, Hancox RJ. Programming obesity and poor fitness: the long-term impact of childhood television. Obesity (Silver Spring). 2008 Jun;16(6):1457-9.

Hancox RJ, Milne BJ, Poulton R. Association between child and adolescent television viewing and adult health: a longitudinal birth cohort study. *Lancet*. 2004 Jul 17-23;364(9430):257-62.

Hu FB, Li TY, Colditz GA, Willett WC, Manson JE. Television watching and other sedentary behaviors in relation to risk obesity and type 2 diabetes mellitus in women. JAMA. 2003 Apr 9; 289(14):1785-91.

Koh-Banerjee P, Chu NF, Spiegelman D, Rosner B, Colditz G, Willett W, Rimm E. (2003). Prospective study of the association of changes in dietary intake, physical activity, alcohol consumption and smoking with nine-year gain in waist circumference among 16,587 US men. *American Journal of Clinical Nutrition*, 78, 719-727.

Oken E, Taveras EM, Popoola FA, Rich-Edwards JW, Gillman MW. Television, walking, and

diet: associations with postpartum weight retention. Am J Prev Med. 2007 Apr;32(4):305-11.

Parsons TJ, Manor O, Power C. Television viewing and obesity: a prospective study in the 1958 British birth cohort. Eur J Clin Nutr. 2008 ; 62(12):1355-63.

Raynor DA, Phelan S, Hill JO, Wing RR. Television viewing and long-term weight maintenance: results from the National Weight Control Registry. Obesity (Silver Spring). 2006 Oct;14(10):1816-24.

Viner RM, Cole TJ. Television viewing in early childhood predicts adult body mass index. J Pediatr. 2005 Oct;147(4):429-35.